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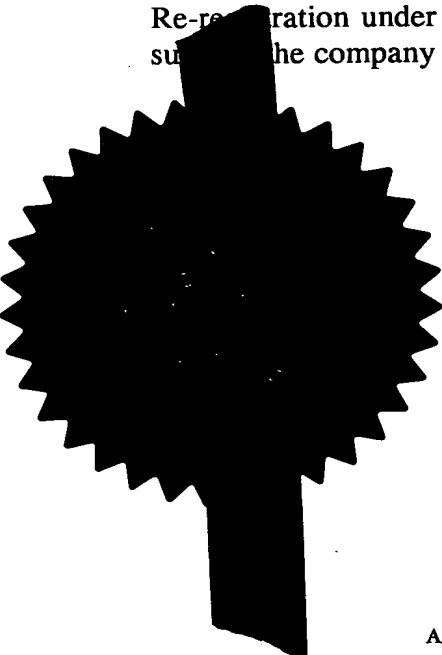
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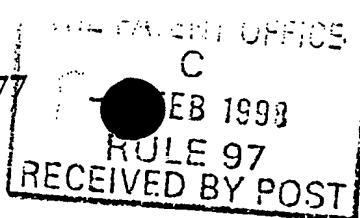
  
*Andrew Gersey*

Dated

12 February 1999

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P01/7700 25.00 - 9802362.5

# Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

The Patent Office

Cardiff Road  
Newport  
Gwent NP9 1RH

1. Your reference

CIBL 10858

2. Patent application number

(The Patent Office will fill in this part)

9802362.5

4 FEB 1998

3. Full name, address and postcode of the or of each applicant (underline all surnames)

CHLORIDE INDUSTRIAL BATTERIES LIMITED  
BTR HOUSE  
CARLISLE PLACE  
LONDON SW1P 1BX  
7372600001  
UNITED KINGDOM

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

4. Title of the invention

BATTERY

5. Name of your agent (if you have one)

ELIZABETH ANNE FENWICK

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

BTR Group Intellectual Property  
Knights House, 2 The Parade  
Sutton Coldfield, West Midlands  
B72 1PH

Patents ADP number (if you know it)

3992773001

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number  
(if you know it)

Date of filing  
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing  
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

- a) any applicant named in part 3 is not an inventor, or
  - b) there is an inventor who is not named as an applicant, or
  - c) any named applicant is a corporate body.
- See note (d))

Yes

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# Patents Form 1/77

9. Enter the number of sheets for each of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form	4
Description	
Claim(s)	2
Abstract	
Drawing(s)	2 + 2

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for preliminary examination and search (Patents Form 9/77)

Request for substantive examination (Patents Form 10/77)

Any other documents (please specify)

11. I/We request the grant of a patent on the basis of this application.

Signature

*E. Fenwick*

Date

03/02/1998

12. Name and daytime telephone number of person to contact in the United Kingdom
- E A Fenwick or B W Treves 0121 362 4864

## Warning

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## Notes

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## BATTERY

This invention relates to a battery (also known as an accumulator), particularly but not exclusively of the lead acid type.

One known lead acid battery comprises a plurality of rectangular lead plates arranged parallel to one another and separated by insulating separating sheets. Alternate plates are positive and negative electrodes respectively, all the positive electrodes being connected together electrically by a first connector and all the negative electrodes being connected together electrically by a second connector, the two connectors being connected to positive and negative terminals respectively.

If the plates, all rectangular, are relatively long and narrow, and the connector and/or terminal is connected to a narrow edge, then there is a relatively long conducting path for the current from the area of the plate adjacent the opposite narrow edge to the connector or terminal. Since the conductivity of lead is significantly less than that of a metal such as copper or aluminium, there is a limit to the current carrying capacity of each electrode, since increasing the current increases the heat generated within the plates. Thus, particularly where other factors dictate that a battery has electrodes which are long and narrow, and the terminals or connectors are attached to a narrow edge of the electrodes, and further if the battery is located in a confined space, the limit on the current carrying capacity is a considerable disadvantage.

It is an object of the present invention to provide a battery in which the adverse effects of this disadvantage are reduced, i.e. the current carrying capacity is increased.

In accordance with the invention a battery comprises a plurality of positive plates connected in parallel and a plurality of negative plates connected in parallel, the positive plates each being of substantially the same size and rectangular shape having two long edges and a first short edge and a second short edge, and a member having a first end and a second end, the first end being electrically connected to the first short edges of the positive plates and the second end being electrically connected to the second short edges of the

positive plates or to one of the long edges of the positive plates immediately adjacent to the second short edges, the member consisting of a material which has a greater conductivity than the material of the positive plates.

The negative plates may each be substantially the same size and rectangular shape having two long edges and a first short edge and a second short edge, and a further member may be provided, the further member having a first end and a second end, the first end being electrically connected to the first short edges of the negative plates and the second end being electrically connected to the second short edges of the negative plates or to one of the long edges of the negative plates immediately adjacent to the second short edges, the further member consisting of a material which has a greater conductivity than the material of the negative plates.

The negative plates and the positive plates may all be substantially the same size and rectangular shape.

The first short edges of the positive plates may be connected by a first connector which is electrically connected to a positive terminal of the battery.

The second short edges of the positive plates may be connected by a second connector which is either of the same material as the positive plates, e.g. in the case of a lead acid battery the material is lead, or, alternatively, of the same material as the member.

If the battery is a lead acid battery, the member preferably comprises copper, or a copper alloy such as brass, or aluminium or an alloy thereof, covered in a lead sheath. The sheath may be covered in an acid resistant material such as an epoxy resin.

Two embodiments of the invention will now be described by way of example only with reference to the accompanying drawings, of which

Figure 1 shows a perspective view of the interior of a lead acid battery according to the first embodiment of the invention, some of the parts being omitted for clarity; and

Figure 2 shows a perspective view of the interior of a battery according to the second embodiment, only the arrangement of positive

plates and attachments being shown.

As shown in Figure 1, the first embodiment of the invention comprises a lead acid battery 10 having a plurality of plates 11 and 12 alternately interleaved with separators 13 comprising sheets of microporous polyethylene and of non-woven glass fibre. The plates 11 and 12 and separators 13 are positioned in face-to-face arrangement and alternate plates are of positive and negative polarity, the positive plates being indicated by reference numeral 11 and the negative plates by reference numeral 12.

The plates and separators are housed in a rectangular container of plastics material (not shown) containing acid (not shown).

All the plates 11 and 12 are generally rectangular in shape and of generally the same size. The horizontal top edge 14 and bottom edge 15 of the plates (as shown) are much shorter than the vertical edges 16. The positive plates 11 are each provided on the top edge with a tag 17, having two parts 17a and 17b, adjacent a corner with a long edge. Directly below, each positive plate is provided on its lower edge with a tag 18 adjacent the corner with the same long edge. The plates are arranged so that the two tags are arranged in two rows, one row directly above the other. The negative plates are each formed with one tag 19 having two parts 19a and 19b on the top edge adjacent the corner with a long edge and the plates are arranged so that the tags 19 form a single row parallel to and spaced apart from the row of tags 17 on the upper edges of the positive plates.

The tags in each upper row lie in general side-by-side arrangement and are each connected by respective connectors 20 and 21. Two sets of terminals 22 and 23 are integrally formed with the respective connectors 20 and 21, the connectors and terminals being formed by a casting operation. The terminals and connectors are of high conductivity copper, embedded in a lead sheath by a casting process.

Connected to the lower row of tags 18 on the positive plates 11 is a first strip 24 of lead and connected by means of a second strip 25 of copper to the connector at the top of the positive plates 11. The first strip of lead and second

strip of copper, which together form a conducting member, are joined by any suitable process to one another, to the lower row of tags and to the upper row of tags to make good electrical connections and are sheathed in lead or other material to prevent corrosion by the acid.

As can be seen in the drawing, the first strip 24 lies in a horizontal plane perpendicular to the plane of the plate and the second strip 25 lies in a vertical plane perpendicular to the plane of the plate except for a small section 26 where it is curved for connection to the first strip.

In the second embodiment of the invention, shown in Figure 2, the second strip of the first embodiment is replaced by a lead sheathed copper strip 28 having the same general shape and dimensions but positioned between a negative plate 12 and a positive plate 11 (as shown) or at one end of the row of plates so as to lie parallel thereto, and separated from the plates by one or more separating sheets. The tags 18 on the lower edges of the positive plates 11 are replaced by tags 30 on a longer side, adjacent the corner with the lower edge. These tags 30 are connected to a lead strip 27 which lies alongside the longer side, rather than alongside the lower edge as in the first embodiment.

In this second embodiment any problems associated with plate growth and/or the deposition of debris, are alleviated.

In either embodiment the high conductivity strip 25 or 28 of copper sheathed with lead may be connected to the lead sheath of the connector 20 or to the copper connector 20 itself. The latter construction has the greater conductivity.

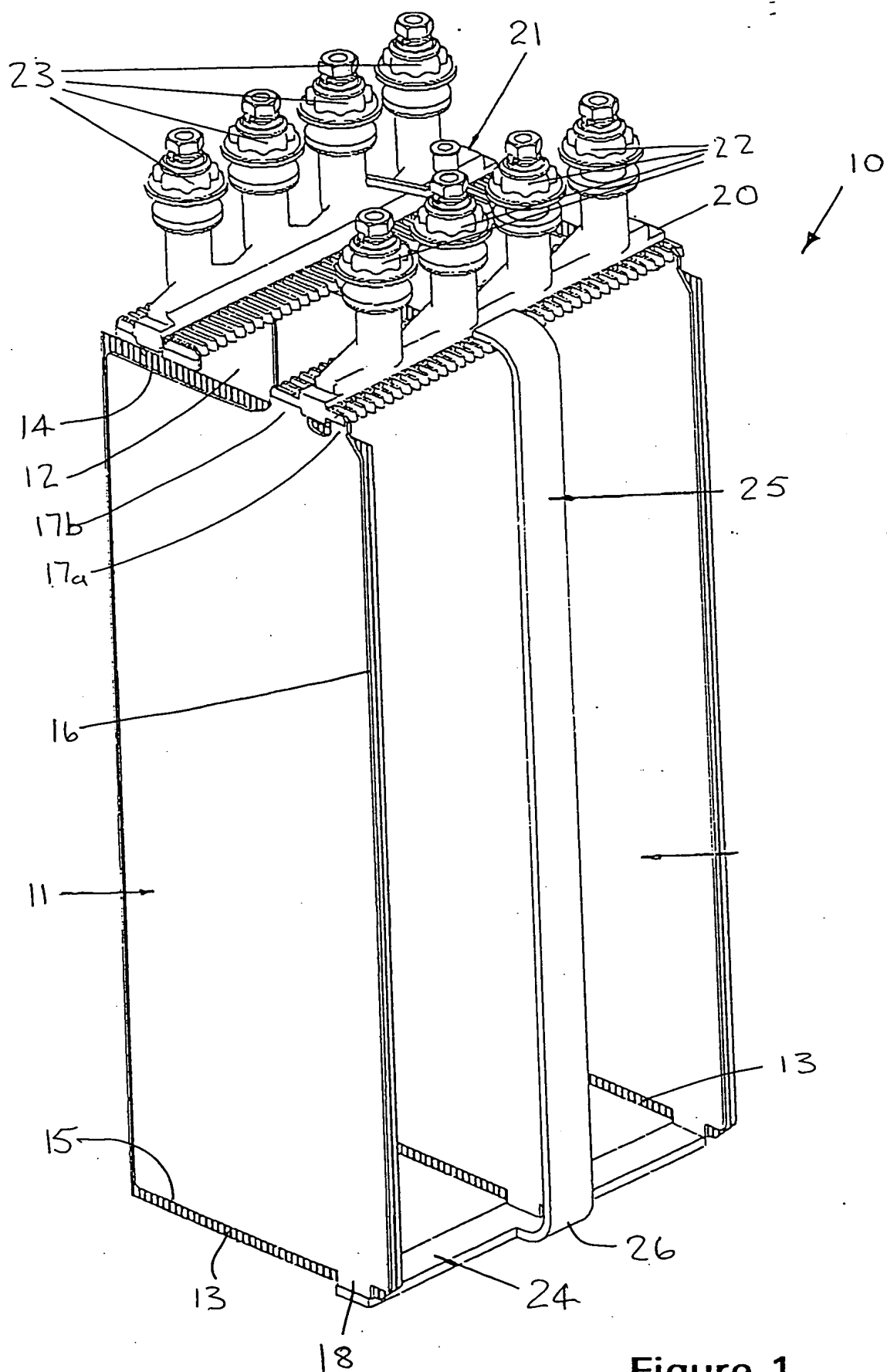


## CLAIMS:

1. A battery comprising a plurality of positive plates connected in parallel and a plurality of negative plates connected in parallel, the positive plates each being of substantially the same size and rectangular shape having two long edges and a first short edge and a second short edge, and a member having a first end and a second end, the first end being electrically connected to the first short edges of the positive plates and the second end being electrically connected to the second short edges of the positive plates or to one of the long edges of the positive plates immediately adjacent to the second short edges, the member consisting of a material which has a greater conductivity than the material of the positive plates.
2. A battery according to Claim 1 wherein the negative plates are each substantially the same size and rectangular shape having two long edges and a first short edge and a second short edge, and a further member may be provided, the further member having a first end and a second end, the first end being electrically connected to the first short edges of the negative plates and the second end being electrically connected to the second short edges of the negative plates or to one of the long edges of the negative plates immediately adjacent to the second short edges, the further member consisting of a material which has a greater conductivity than the material of the negative plates.
3. A battery according to either Claim 1 or Claim 2 wherein the negative plates and the positive plates are all substantially the same size and rectangular shape.
4. A battery according to any one of the preceding claims wherein the first short edges of the positive plates are connected by a first connector which is electrically connected to a positive terminal of the battery.
5. A battery according to any one of the preceding claims wherein the second short edges of the positive plates are connected by a second connector.
6. A battery according to Claim 5 wherein the second connector is of the same material as the positive plates.
7. A battery according to Claim 5 wherein the second connector is of the same material as the member.

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8. A battery according to any one of the preceding claims which is a lead acid battery.
9. A battery according to Claim 8 wherein the member comprises copper covered in a lead sheath.
10. A battery according to Claim 8 wherein the member comprises a copper alloy such as brass, covered in a lead sheath.
11. A battery according to Claim 8 wherein the member comprises aluminium covered in a lead sheath.
12. A battery according to Claim 8 wherein the member comprises an aluminium alloy covered in a lead sheath.
13. A battery according to any one of Claims 9 to 12 wherein the sheath is covered in an acid resistant material such as an epoxy resin.
14. A battery substantially as described herein with reference to and as shown in Figure 1 of the accompanying drawings.
15. A battery substantially as described herein with reference to and as shown in Figure 2 of the accompanying drawings.



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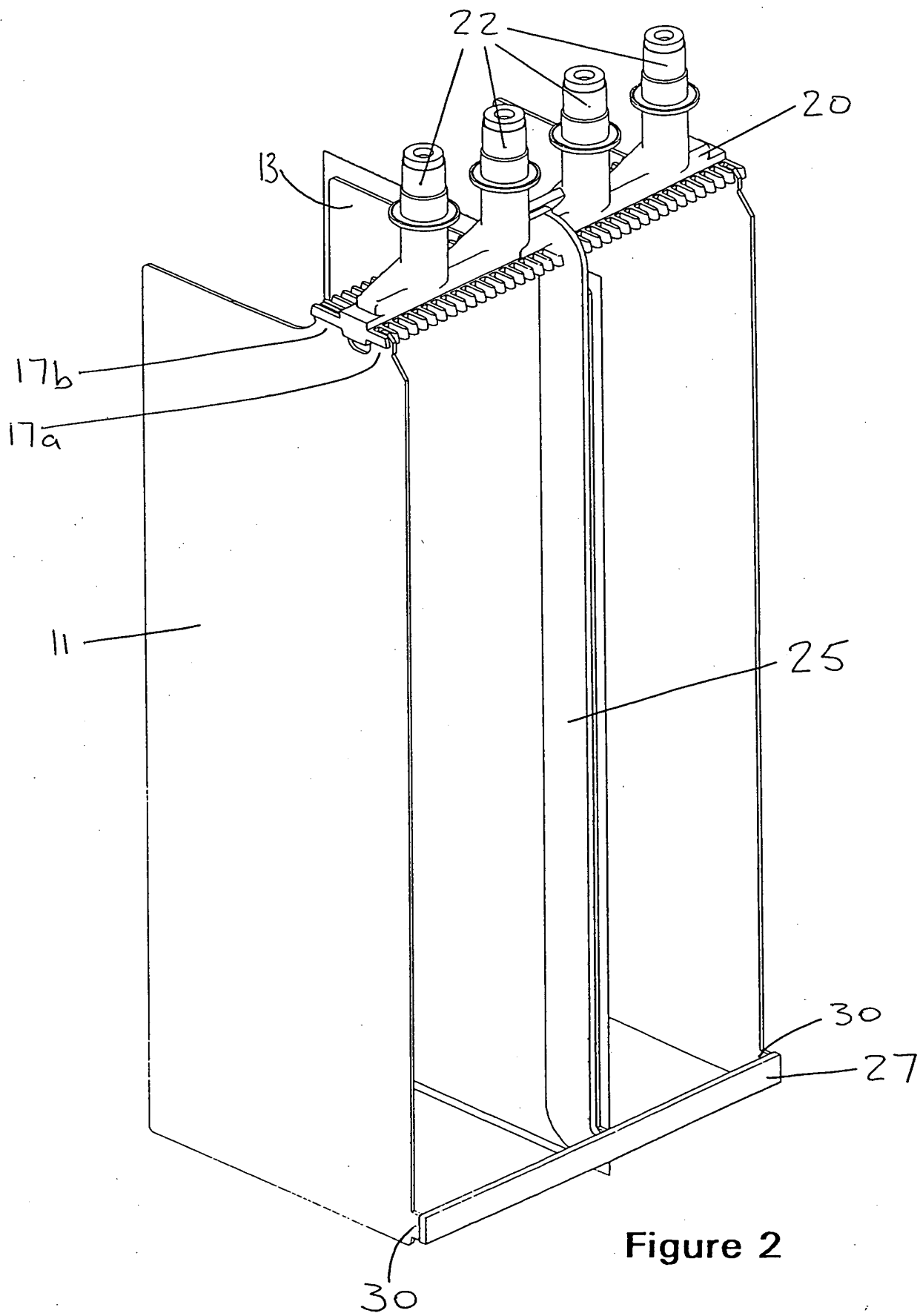


Figure 2

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